

What is claimed is:

1 1. A method of calculating a write condition detection
2 index, the method determining an index R_m that is indicative
3 of a write condition for an optical disk when information is
4 written to the optical disk, the method comprising the steps
5 of:

6 A) detecting, as a light intensity level S_p , a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power P_{wl} that is sufficient
9 to generate pit portions;

10 B) detecting, as a light intensity level S_s , the intensity
11 of light reflected from a space portion when the disk is
12 irradiated with laser beams with power that is insufficient
13 to generate pit portions; and

14 C) determining said index R_m using the following equation:

$$15 \quad R_m = S_p/S_s/(Pw1)^2.$$

1 2.The method of calculating a write condition detection
2 index according to claim 1, wherein said step C) includes:
3 determining said index R_m for at least one circumference
4 of said optical disk;

5 averaging the indices Rm_i and

6 setting the average value obtained as a true index R_m .

1 3. The method of calculating a write condition detection
2 index according to claim 1, the method further comprising the
3 steps of:

4 detecting said light intensity levels Sp and Ss and said
5 power Pw1 for at least one circumference of said optical disk;
6 calculating the average of each of the light intensity
7 levels Sp and Ss and power Pw1; and
8 calculating said index Rm using the averages.

1 4. A method of calculating a write condition detection
2 index, the method determining an index Rm that is indicative
3 of a write condition for an optical disk when information is
4 written to the optical disk, the method comprising the steps
5 of:

6 A) detecting, as a light intensity level Sp, a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power Pw1 that is sufficient
9 to generate pit portions; and

10 B) determining said index Rm using the following equation:

11
$$Rm = Sp / (Pw1)^2.$$

1 5. The method of calculating a write condition detection
2 index according to claim 4, wherein said step B) includes:

3 determining said index Rm for at least one circumference
4 of said optical disk;

5 averaging the indices Rm; and

6 setting the average value obtained as a true index Rm.

10056037.012202

1 6. The method of calculating a write condition detection
2 index according to claim 4, the method further comprising the
3 steps of:

4 detecting said light intensity level S_p and said power
5 P_{w1} for at least one circumference of said optical disk;
6 calculating the average of each of the light intensity
7 level S_p and power P_{w1} ; and
8 calculating said index R_m using the averages.

1 7. A method of writing information to an optical disk
2 by calculating a write condition detection index that is
3 indicative of a write condition for the optical disk when
4 information is written to the optical disk, the method
5 comprising the steps of:

6 detecting, as a light intensity level S_p , a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power P_{w1} that is sufficient
9 to generate pit portions;
10 detecting, as a light intensity level S_s , the intensity
11 of light reflected from a space portion when the disk is
12 irradiated with laser beams with power that is insufficient
13 to generate pit portions; and
14 determining said index R_m using the following equation:
15 $R_m = S_p/S_s/(P_{w1})^2$;
16 determining said index R_m for at least one circumference
17 of said optical disk;
18 averaging the indices R_m ;

10056033.012602

19 setting the average value obtained as a true index R_m ;
20 and
21 measuring said true index R_m whenever information is
22 written to the optical disk and controlling said power P_{wl}
23 so as to minimize a difference between the true index R_m and
24 a target value thereof.

1 8. The optical disk writing method according to claim
2 7, further comprising the steps of:
3 calculating said index R_m during OPC (Optimum Power
4 Calibration) using a method of calculating a write condition
5 detection index; and
6 setting the index R_m as said target value.

1 9. The optical disk writing method according to claim
2 7, further comprising the steps of:
3 calculating said R_m when calibration is executed in a
4 PCA (Power Calibration Area) with optimum write power, using
5 a method of calculating a write condition detection index;
6 and
7 setting the index R_m as said target value.

1 10. The optical disk writing method according to claim
2 7, further comprising the steps of:
3 measuring said index R_m immediately after the start of
4 an actual write to a data area, using said method of calculating
5 a write condition detection index; and

1005603-012802

6 setting the index Rm as said target value.

1 11. A method of writing information to an optical disk
2 by calculating a write condition detection index that is
3 indicative of a write condition for the optical disk when
4 information is written to the optical disk, the method
5 comprising the steps of:

6 detecting, as a light intensity level Sp, a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power Pw1 that is sufficient
9 to generate pit portions;

10 detecting, as a light intensity level Ss, the intensity
11 of light reflected from a space portion when the disk is
12 irradiated with laser beams with power that is insufficient
13 to generate pit portions; and

14 determining said index Rm using the following equation:

15
$$Rm = Sp/Ss/(Pw1)^2;$$

16 detecting said light intensity levels Sp and Ss and said
17 power Pw1 for at least one circumference of said optical disk;

18 calculating the average of each of the light intensity
19 levels Sp and Ss and power Pw1;

20 calculating said index Rm using the averages; and

21 measuring said index Rm whenever information is written
22 to the optical disk and controlling said power Pw1 so as to
23 minimize a difference between the index Rm and a target value
24 thereof.

10056033.012002

1 12. The optical disk writing method according to claim
2 11, further comprising the steps of:
3 calculating said index R_m during OPC (Optimum Power
4 Calibration) using a method of calculating a write condition
5 detection index; and
6 setting the index R_m as said target value.

1 13. The optical disk writing method according to claim
2 11, further comprising the steps of:
3 calculating said index R_m when calibration is executed
4 in a PCA (Power Calibration Area) with optimum write power,
5 using a method of calculating a write condition detection
6 index; and
7 setting the index R_m as said target value.

1 14. The optical disk writing method according to claim
2 11, further comprising the steps of:
3 measuring said index R_m immediately after the start of
4 an actual write to a data area, using said method of calculating
5 a write condition detection index; and
6 setting the index R_m as said target value.

1 15. A method of writing information to an optical disk
2 by calculating a write condition detection index that is
3 indicative of a write condition for the optical disk when
4 information is written to the optical disk, the method
5 comprising the steps of:

10056033.012002

6 detecting, as a light intensity level Sp , a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power $Pw1$ that is sufficient
9 to generate pit portions;
10 determining said index Rm using the following equation:
11 $Rm = Sp / (Pw1)^2$;
12 determining said index Rm for at least one circumference
13 of said optical disk;
14 averaging the indices Rm ;
15 setting the average value obtained as a true index Rm ;
16 and
17 measuring said true index Rm whenever information is
18 written to the optical disk and controlling said power $Pw1$
19 so as to minimize a difference between the true index Rm and
20 a target value thereof.

1 16. The optical disk writing method according to claim
2 15, further comprising the steps of:
3 calculating said index Rm during OPC (Optimum Power
4 Calibration) using a method of calculating a write condition
5 detection index; and
6 setting the index Rm as said target value.

1 17. The optical disk writing method according to claim
2 15, further comprising the steps of:
3 calculating said index Rm when calibration is executed
4 in a PCA (Power Calibration Area) with optimum write power,

10056033-012802

5 using a method of calculating a write condition detection
6 index; and
7 setting the index R_m as said target value.

1 18. The optical disk writing method according to claim
2 15, further comprising the steps of:
3 measuring said index R_m immediately after the start of
4 an actual write to a data area, using said method of calculating
5 a write condition detection index; and
6 setting the index R_m as said target value.

1 19. A method of writing information to an optical disk
2 by calculating a write condition detection index that is
3 indicative of a write condition for the optical disk when
4 information is written to the optical disk, the method
5 comprising the steps of:
6 detecting, as a light intensity level S_p , a
7 stable-intensity portion of light reflected when the disk
8 is irradiated with laser beams with power P_{w1} that is sufficient
9 to generate pit portions;
10 determining said index R_m using the following equation:
11 $R_m = S_p / (P_{w1})^2$;
12 detecting said light intensity level S_p and said power
13 P_{w1} for at least one circumference of said optical disk;
14 calculating the average of each of the light intensity
15 level S_p and power P_{w1} ;
16 calculating said index R_m using the averages; and

10055033.012802

17 measuring said index Rm whenever information is written
18 to the optical disk and controlling said power Pw1 so as to
19 minimize a difference between the index Rm and a target value
20 thereof.

1 20. The optical disk writing method according to claim
2 19, further comprising the steps of:

3 calculating said index Rm during OPC (Optimum Power
4 Calibration) using a method of calculating a write condition
5 detection index; and

6 setting the index Rm as said target value.

1 21. The optical disk writing method according to claim
2 19, further comprising the steps of:

3 calculating said index Rm when calibration is executed
4 in a PCA (Power Calibration Area) with optimum write power,
5 using a method of calculating a write condition detection
6 index; and

7 setting the index Rm as said target value.

1 22. The optical disk writing method according to claim
2 19, further comprising the steps of:

3 measuring said index Rm immediately after the start of
4 an actual write to a data area, using said method of calculating
5 a write condition detection index; and

6 setting the index Rm as said target value.

20050307 012002

23. An optical disk write apparatus that determines an index R_m indicative of a write condition for an optical disk in writing information to the optical disk and controls power P_{w1} that is sufficient to generate pit portions so as to minimize a difference between the index R_m and a target value thereof, the apparatus comprising:

means for detecting, as a light intensity level S_p , a stable-intensity portion of light reflected when the disk is irradiated with laser beams with said power P_{w1} ;

means for detecting, as a light intensity level S_s , the intensity of light reflected from a space portion when the disk is irradiated with laser beams with power that is insufficient to generate pit portions;

means for determining said index R_m using the following equation:

$$R_m = S_p / S_s / (P_{w1})^2 ; \text{ and}$$

means for controlling said power P_{w1} so as to minimize a difference between the index R_m and the target value thereof.

24. An optical disk write apparatus that determines an index R_m indicative of a write condition for an optical disk in writing information to the optical disk and controls power P_{w1} that is sufficient to generate pit portions so as to minimize a difference between the index R_m and a target value thereof, the apparatus comprising:

1005603.012802

7 means for detecting, as a light intensity level S_p , a
8 stable-intensity portion of light reflected when the disk
9 is irradiated with laser beams with said power P_{w1} ;
10 means for determining said index R_m using the following
11 equation $R_m = S_p / (P_{w1})^2$; and
12 means for controlling said power P_{w1} so as to minimize
13 a difference between the index R_m and the target value thereof.

10056033.012802